

O T I S (W. J.)

*External Piles and Their Relation to the
External Hemorrhoidal Veins.*

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EXTERNAL PILES AND THEIR RELATION TO THE EXTERNAL HEMORRHOIDAL VEINS.

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THE swellings and vascular tumors occurring at the lower extremity of the alimentary canal, known as hemorrhoids or piles, are very naturally classified, according to their position, as either external or internal. This classification is based not only on the fact that one group is in view and covered with skin, while the other is concealed within the bowel and covered with mucous membrane, but also on account of their relations to the external and internal hemorrhoidal veins respectively.

As the essential element in a large majority of hemorrhoidal swellings is a varicose condition of the hemorrhoidal veins, the study of this disease cannot lead to any satisfactory results unless based upon a comprehensive and accurate knowledge of the arrangement of these veins. The hemorrhoidal veins comprise the internal or superior hemorrhoidal, the middle hemorrhoidal, and the external hemorrhoidal, all of which accompany the arteries bearing the same names.

The *internal or superior hemorrhoidal veins*, an important factor when in a diseased condition in the production of internal piles, form a complex interlacement in the submucosa of the lower rectum, known as the hemorrhoidal plexus. These veins are valveless and collect the venous blood from the mucous membrane of the rectum, conducting it through openings in the *muscularis* into the inferior mesenteric vein, thus forming the most dependent portion of the portal system.

The point in the anal canal that marks the transition from skin to mucous membrane also marks the lowest and most distant region in the body tributary to the *vena portae*. This transition takes place quite abruptly, a little above the lower border of the internal sphincter. In the living body its approximate location is determined by the presence of a more or less distinct sulcus or groove completely encircling the anal outlet in a somewhat zigzag course (see Plate, Fig. 1, *g*). This groove also marks a point from which the venous blood flows in two different directions; a watershed, so to speak, of the portal veins on the one side, the iliac veins on the other, but a watershed of such low altitude that under certain conditions it does not interpose a sufficient barrier to prevent an intermingling of the two streams. At this point, as will be



seen by the accompanying drawing made from one of my dissections, the external and internal hemorrhoidal veins are continuous one with the other, the communication being established by numerous short and narrow anastomoses in the submucous-cutaneous tissue underlying this groove a little above the lower border of the internal sphincter.

From these short and narrow anastomosing branches the external and internal hemorrhoidal veins may be said to begin; the internal veins ascending in the submucosa of the rectum, the external veins descending and radiating away from the rectum, under the skin. The internal veins, as they ascend from this point of origin, immediately break up into a meshwork¹ of short and irregularly-dilated branches for the most part fusiform and bulbous² in shape, completely encircling the canal and confined to that portion of the submucosa included within the grasp of the internal sphincter. On examining this part of the venous apparatus more closely, these dilatations or ampulla-like sacculations are seen to be arranged in clusters³ in a circular manner, situated in the bases of the longitudinal folds of the mucous membrane of the rectum, known as the *columnæ recti*. These clusters of sacculations spread out laterally as well as centrally, and communicate one with the other, while the axes of their component parts are vertical. They do not hang from their efferent veins like grapes from their stems, for they are possessed of afferent veins as well, and appear to be nothing more or less than varicosities that have undergone a certain amount of proliferation. As the upper border of the internal sphincter is approached they converge and reunite, forming large trunks which pass up the bowel alongside of the terminal branches of the superior hemorrhoidal arteries. In the mean-

DESCRIPTION OF PLATE.

FIG. 1.—An alcoholic preparation of the lower rectum opened lengthwise in the median line anteriorly, a portion of the mucous membrane and moco-cutaneous tissue having been removed to expose the internal and external hemorrhoidal veins.

X, X'. The lowermost *plica transversalis recti*, one of a series of ineffaceable transverse folds that are present in the rectum, with considerable variation as to their number and distinctness in different individuals. These folds are arranged, one beyond the other alternately on the left and right sides of the rectum, and are analogous to the transverse folds that characterize the colon, showing, as I have elsewhere demonstrated (Leipsic, 1887), that the rectum, like the colon, is sacculated. a. The short and narrow anastomoses between the dilated portion of the internal hemorrhoidal veins above and the dilated portion of the external hemorrhoidal veins below. e. Dilated external hemorrhoidal veins. g. The sulcus or groove that encircles the anal orifice. Just above are to be seen the *columnæ* and *lacunæ* of Morgagni. i.s. Internal sphincter. e.s. External sphincter.

FIG. 2.—A semi-diagrammatic drawing of a longitudinal section through the side of the lower end of the rectum.

1. Skin. 2. External sphincter. 3. Levator ani. 4. Longitudinal muscular fibres. 5. Circular muscular fibres terminating in the internal sphincter. 6. Internal hemorrhoidal veins in the submucosa. 7. Mucous membrane. 8. One or more papillæ are often seen on the bases of the columns; this is due to the fact that the papillary layer of the external skin extends for a short distance above the groove onto the columns, while in the lacunæ between the columns the follicles of the mucous membrane are present as low down as the groove. 9. The *ano-rectal* groove which is produced by the distention of the internal veins just above it and the external veins just below it. In the dead body, where the veins are empty, the groove will not be apparent. 10. Dilated portion of an external hemorrhoidal vein.

FIG. 1.

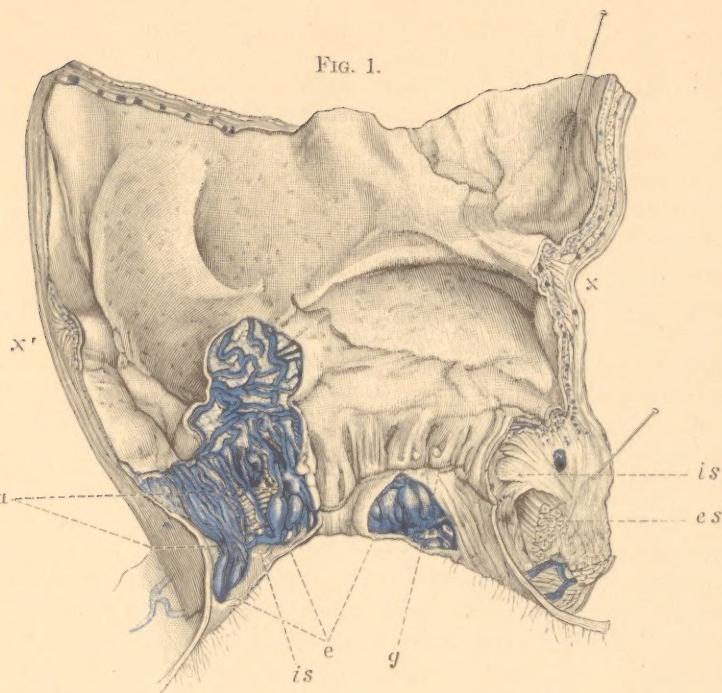
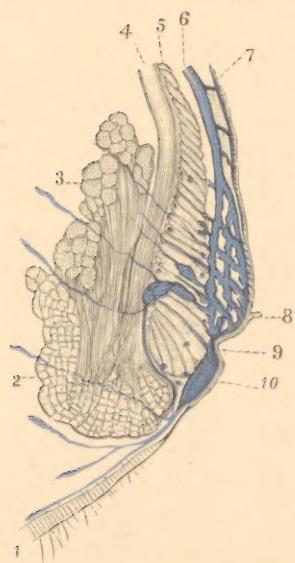
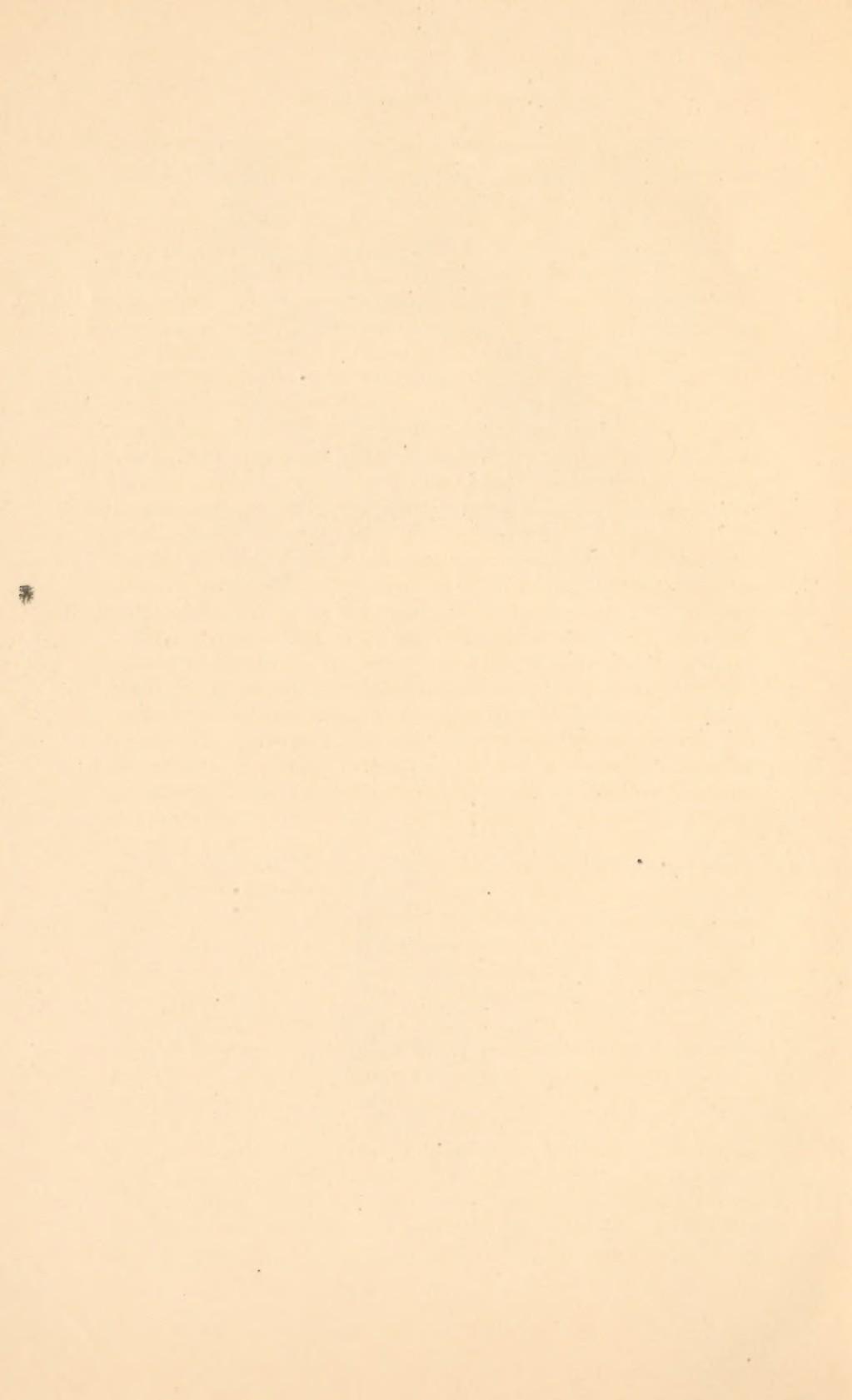


FIG. 2.





time, numerous fine branches have been given off from the sacculations to traverse the fibres of the sphincters⁴ and to find their way, by a more circuitous route, into the iliac veins.

The *external hemorrhoidal veins* do not present such a complicated arrangement of sacculations as is seen in the internal veins just described; but they, in turn, as they emerge from the lower border of the internal sphincter, are very much dilated, so that the lower border of the internal sphincter and the internal border of the external sphincter are completely hidden by the pouch-like dilatations of these veins. From here the veins abruptly narrow down, and form an interlacing network of fine subcutaneous branches, inosculating to form larger branches, finally emptying into the internal pudic veins. Thus it will be seen that it is possible to inject from the inferior mesenteric vein all the hemorrhoidal veins,⁵ both within and without the lower rectum, with the exception of the middle hemorrhoidal veins, an exception accounted for by the fact that these veins are by no means constant,⁶ and that when they are present⁷ they do not start from the mucous membrane of the rectum and consequently are not a factor in the production of hemorrhoids.

Looking at these veins collectively, two points are to be noted: First. The lower end of the rectum is surrounded by two rings, or zones, of dilated plexiform veins, forming an internal and an external hemorrhoidal plexus, the one situated just within the bowel, and corresponding in area with the internal surface of the internal sphincter, the seat of internal hemorrhoids; the other zone situated just without the bowel, and corresponding in area with the internal border of the external sphincter, the seat of external hemorrhoids. Secondly, that the two plexuses communicate, the anastomosis taking place in the submucosa underlying an *ano-rectal groove*. Whether this arrangement of the rectal veins exists in the early stage of life I cannot say; but that it occurs normally in the adult seems to me very probable, intensified and aggravated, no doubt, by the erect position of the body, the dependent position of the veins, and the act of defecation.

I have selected as the topic for this paper external piles, particularly on account of the intimate relations borne by some of these swellings to the external hemorrhoidal veins; some, on the other hand, having no connection whatsoever; hence, the reason I use the general term piles in preference to hemorrhoids, as, bleeding not being a symptom of external piles, external cutaneous piles certainly cannot, strictly speaking, be called hemorrhoids. With a view to ascertain the relative frequency of internal and external piles, I have gone over the cases of rectal disease that have applied to me for treatment during the past few years at the Boston Dispensary. Out of the total number of 1475 cases, 895 have come under my personal observation. Of these 892 cases 338 were cases of piles, 171 internal, 167 external piles. These

data are not sufficiently exhaustive to warrant the inference that internal piles are of more frequent occurrence than external, though I believe this to be the case, for it must be remembered that external piles in the acute stage are very distressing, with no cessation during the attack, compelling the sufferer to seek medical aid; while, on the other hand, many persons who are subject "off and on" to internal piles are only conscious of the disease during a period of constipation, and then only at the time of defecation, with comparative comfort during the intervals. Such cases are not compelled, as in the first instance, to seek medical advice, and either do nothing or rely upon favorite remedies recommended by friends or the nearest druggist.

As the tissue involved in the production of external piles is either vein or skin, they can be divided into two principal varieties, venous and cutaneous.

The venous variety of external pile occurs in two forms:

1. As a varicose condition of the external hemorrhoidal plexus.
2. As a thrombosis of the external hemorrhoidal plexus.

1. A *varicose condition* of the external hemorrhoidal plexus,⁸ I have already pointed out, is probably the normal arrangement in every adult. A familiar instance of this is seen in every operating-room with a patient in the lithotomy position when pressure is brought to bear on the abdominal contents, as by the straining of vomiting. It is also made evident by the act of defecation when the internal sphincter dilates to let the contents of the rectum pass out. The extent to which this venous dilatation is carried will vary with the habits of the individual as regards constipation and the amount of straining and bearing-down at stool. This form of the disease is most marked in those persons who are subject to internal piles; in fact, in these cases it is a symptom of internal piles. Inasmuch as the blood by which this plexus of veins is dilated comes from within the bowel, that is, a backward flow from the portal veins, the condition of the internal sphincter is also going to affect the amount of varicosity present in these veins: the stronger and tighter the muscle contracts the less the amount of regurgitation; the weaker and looser the contraction the greater the amount of blood that will be forced by.

To make my meaning clearer I must refer briefly to the anatomy of the internal sphincter (see Plate, Fig. 2). This muscle is a thickening of the lowermost fibres of the circular muscular coat of the rectum, encircling like a wide and thick band the extreme end of the alimentary canal for a distance of about $1\frac{1}{2}$ inches. Its fibres being non-striated, it is an involuntary muscle, and, except during the exit of gas and feces, it is always in a state of firm tonic contraction. The puckering of the mucocutaneous integument into folds, which are seen radiating from the anus, is due to the tight contraction of this muscle; hence, it is evident that

its lower ring-like border must be subcutaneous, a point in the anatomy of this muscle not generally appreciated. The external sphincter is placed just outside of the internal sphincter, which it surrounds and partially overlaps, its lower border reaching from one-half to three-quarters of an inch below that of the internal sphincter. Consequently the internal sphincter is internal to the external in two senses—in one sense that it is surrounded by it, in the other sense that it is placed a little further within the body. The external sphincter is a voluntary muscle, and when at rest exerts no active influence in closing the anus, that office being performed by the internal sphincter; but when gas or feces are propelled by peristalsis against the upper border of the internal sphincter, then the sensation of an impending evacuation is produced, the internal sphincter dilates and offers no resistance, and a threatened disaster can only be prevented by voluntary contraction of the external sphincter, together with the other perineal muscles. The firm tonic contraction of the internal sphincter above alluded to, a condition which obtains for the entire twenty-four hours, with the trifling exception of the time consumed in passing the contents of the bowel, presents an obstacle to the regurgitation of portal blood essential to dilatation of the external hemorrhoidal plexus. We must assume either the presence of hepatic obstruction or intra-abdominal pressure of whatever kind, or the existence of a constipated habit with prolonged straining at stool, as the force at work to produce a varicose condition of these veins. Without ignoring the significance of the more remote causes I am inclined to believe that the act of defecation is the most important factor in the production of this condition.⁹ As long as the veins remain pervious and free from inflammation there will be no very marked symptoms, and the patient will, in all probability, be unaware of the existence of the disease; but when any portion of these varicose veins becomes the seat of thrombosis and phlebitis, a not infrequent occurrence, then will be produced the second variety of the external venous pile, known as the thrombotic pile.

2. The *thrombotic pile*¹⁰ is of very common occurrence. In fact, it is met with much more frequently than any of the other forms of external pile. Of the 167 cases of external piles mentioned above, 107 were of this nature. It has been my experience to find it much oftener in the male than the female. It is liable to happen to any one, regardless of his condition, circumstances, or habits. Among the class of patients that frequent the Boston Dispensary it is not uncommon to find that the disease appeared during a protracted debauch, and also to find it associated with constipation or a particularly hard and difficult stool; while, on the other hand, it happens as well to the temperate and those with strictly regular habits. The disease makes its appearance quite suddenly, sometimes with a premonition of from a few to twenty-four

hours of local soreness and slight swelling before the tumor is fully formed. From the suddenness of its appearance the patient often imagines that it is a prolapsed internal pile, and needless suffering is caused by fruitless attempts to push it back. The site of the pile is identical with that of the varicose pile just described, that is, in any portion of the zone of dilated veins forming the external hemorrhoidal plexus. Such a tumor would be located just below the lower border of the internal sphincter, opposite to and within the grasp of the external sphincter. The size depends entirely upon the size and number of the thrombosed veins, while its shape is flat, with a broad base resembling somewhat in appearance a large bleb of dark color. The color of the pile is quite characteristic, livid, with dark-blue spots here and there, this color not belonging to the tissue, but transmitted through it from the thrombus or thrombi within.

When thrombosis occurs in this locality the process appears to be limited to the dilated portions of these veins without complete stasis affecting a large territory, and the resulting reaction is confined to the walls of the vessels immediately affected whose vessels of supply are obstructed, giving rise to slight inflammatory swelling with moderate redness, considerable pain, and a watery infiltration of the cellular tissue.¹¹ In some cases of thrombotic pile the amount of oedematous swelling is so marked as to be misleading and obscure the actual condition present, but by keeping up a firm and continuous pressure with the fingers it will be possible to make out the presence of one or more hard and very sensitive nodules indicating the location of the thrombi. If the thrombotic pile is let alone, it will, as a rule, entirely disappear without leaving any external evidence of its existence. However, if from the amount of pain present, and from the inconvenience of the swelling, incision be deemed advisable, immediate relief will be given; but by the addition of the element of trauma a small but permanent cutaneous pile is likely to remain after complete convalescence. In all such cases it is my practice to advise immediate incision to let out the clot and relieve the tension, to accomplish which purpose I use an ordinary but sharp scalpel, first washing the surface of the pile with a 5 per cent. solution of carbolic acid; selecting as the point of incision a dark-blue spot or a point directly over the largest nodule (for it is rare not to find more than one), a quick and deep incision is made directly into the thrombosed vein. Oftentimes the thrombus will shell out like a bean from its pod, but more often the thrombus will only protrude from the opening, being held back either by an adhesion to the wall of the vein or by an extension into a communicating branch, requiring a little force to relieve it. On looking into the wound thus made more thrombosed veins will be seen, which can be opened as well from the cut already made as from a second incision; but a second and even a third

incision is sometimes necessary, especially in case the pile occupies the entire side of the anus. After the removal of the thrombi, the swelling being perceptibly reduced in size, the pile is washed with a 1:3000 bichloride solution and the wound dusted with a powder of equal parts of iodoform and boric acid; to prevent bleeding and further swelling firm pressure is applied by means of a graduated compress and maintained with a T-bandage tightly drawn for the next twenty-four hours, or longer if possible. I have seen on a few occasions a thrombotic pile from which there was a constant oozing of blood. This invariably occurred in a pile that had been present for two or more weeks, the bleeding causing the patient to seek medical aid. The appearance presented was that of a moderate-sized pile with a sloughing of the integument directly over the thrombus, and through the breach thus formed was protruding the thrombus partially organized. How the coagulum in these cases got out of the vein I am unable to say, but as there was always more or less suppuration present, it is possible that that process had something to do with it. This is one of the very rare instances in which bleeding occurs as a symptom of external piles.

FIG. 3.



Showing the general shape and form of thrombi that have been removed from thrombotic piles during life.

Examination of the thrombi, after their removal, reveals a decided similarity in shape, the majority conforming to one type, conical, tapering to a fine thread-like point, the color of the thrombus in its thickest portion being a deep blood-red; at the edges and the tapering point it is a translucent pink.

In the light of the anatomical arrangement of the veins where these thrombi are formed, it is impossible to come to any other conclusion than that the coagula are casts of these veins.

With a view to determining whether, as Ball states, these thrombi are formed within and not without the veins, for sometime past I have been in the habit of saving all thrombi and preserving them in alcohol for the purpose of studying and comparing their shapes. The result has fully established the accuracy of the views of this writer.

The accompanying cut represents some of these clots arranged for exhibition on a piece of glass. The general shape to which they all conform is conical, with a rounded base; some are casts of a single dilated vein, while others are evidently casts of two or more communicating branches. Many writers deem this form of venous pile an encysted blood clot occurring outside the vein, brought about by extravasation of blood from a rupture of one of the external hemorrhoidal veins during defecation. That this view of the disease is an erroneous one is proven, I think: (1) by the absence of any staining of the tissues which characterizes extravasation; (2) by the fact that when the pile is incised the thrombosed veins can be seen side by side in the infiltrated cellular tissue, incision into the vein demonstrating the presence of the thrombus; (3) by the fact that the thrombi are casts of the veins in which they are formed.

In the second variety of external pile (*the cutaneous*) the external hemorrhoidal veins do not play so important a rôle as in the venous pile just described. Cutaneous piles are essentially swellings or hypertrophies of the muco-cutaneous integument, and with one exception are brought about by, or are secondary to, some inflammatory process just within or near the anus. As it is possible to recognize three different forms of cutaneous pile, I would suggest for their more ready comprehension the following classification:

1. The redundant pile.
2. The hyperplastic pile.
3. The hypertrophic pile.

1. The *redundant pile* is that condition of the anal muco-cutaneous tissue often met with and variously described as a simple redundancy, or again as a superabundance of skin. It is in reality a compensatory increase in the amount of the circumanal integument, brought about not by any inflammatory process but by stretching—a stretching of the skin resulting from excessive distention of the subjacent veins in those individuals in whom the act of defecation is accompanied with excessive and prolonged expulsive efforts. The stretched skin hangs in loose folds like a fringe, either entirely surrounding the anal outlet or confined to one side, or occurring only at one or more isolated points, and wherever found is a sure indication of the existence of a varix directly underlying it.

The redundant pile is soft to the touch, and the two surfaces of the reduplicated skin are freely movable upon each other. In marked contrast to this appearance of the pile is that observed during defecation. Then the slack is all taken up and the skin put upon the stretch by the swelling and distention of the subjacent veins. Like the varicose pile, it is always associated with and secondary to internal piles, and when occurring in its fullest degree may be taken as an indication of the existence of internal piles of long standing with a weakened internal sphincter. This weakness or looseness of the internal sphincter is caused by the stretching it receives from the frequent prolapse of the internal hemorrhoidal tumors. Another phase of the redundant pile is seen whenever internal piles have become prolapsed and strangulated. Then the resulting venous hyperæmia and the obstructed lymph channels give rise to an œdematosus swelling of the loose muco-cutaneous tissue just outside of the prolapsed internal pile or piles. If the prolapsed rectal tissue comprise only a portion of the internal pile area, then the external swelling will be confined to the adjacent integument; but if it involve the entire circumference of the internal "pile-bearing area," then it will surround it as a ring, each form of pile having its own peculiar color, the two being separated by a deep sulcus,¹² the same sulcus or groove already described as separating the internal and external hemorrhoidal venous plexuses.

In cases of *prolapsus recti* not associated with internal piles, if the middle or upper portion of the rectum be the part extruded, the condition is that of an invagination, and for obvious reasons the ring-shaped œdematosus redundant pile will not be present. The presence or absence of this condition may be therefore of some diagnostic value in determining between prolapsed internal piles and prolapsed rectum.

2. The *hyperplastic pile* is always associated with a breach of the muco-cutaneous surface just at the lower border of the internal sphincter. The chief exciting causes are abrasions, fissures, or ulcerations of whatever nature that have been engrafted upon this locality. The resulting swelling in this instance is analogous to the swelling of loose cellular tissue in other parts of the body following a breach of its cutaneous surface, which subsides and disappears with the healing of the breach. But if the irritation is continued for a sufficient length of time there will result a hyperplasia of the contiguous skin and subcutaneous connective tissue, forming at the anal margin a flattened and pendulous tumor, or, as it is generally called, a cutaneous "tag." A common instance of this form of cutaneous pile is seen in connection with fissures, and as fissures occur most often posteriorly, the existence of an acutely-inflamed cutaneous pile in this region is pathognomonic of an ulceration just above it.¹³ Ulceration of the lower rectal mucous membrane with its lowest termination just emerging from the lower border of the internal sphinc-

ter is a very frequent cause of the hyperplastic pile. The cutaneous pile associated with stricture of the rectum low down¹⁴ belongs to this class, and when found in this connection I always regard it an evidence of the ulceration having extended as low down as the anal margin. Cutaneous piles, resulting from surgical operations in this region, where there has been some delay in the healing process, also belong to this class. The hyperplastic pile is somewhat hard and firm to the touch, and its two opposing surfaces are not readily movable upon each other, owing to more or less hyperplasia of the subcutaneous connective tissue. As I have already remarked, it is flattened and pendulous, with a more or less elongated and narrow base, which may or may not correspond to the central or anal end of one of the normal radiating folds. During the acute or growing period of its existence this pile is exquisitely sensitive from oedematous swelling, and is a source of great annoyance, while in the chronic state, after the exciting cause has been repaired, the pile assumes a state quite similar to the redundant pile, with no particular symptoms other than the inconvenience arising from its size; but it is to be distinguished from the redundant pile by its harder and firmer feel and by more or less adhesion of its opposing surfaces. In this, as in all cutaneous piles, repeated attacks of oedematous swelling occur, each attack adding materially to the hyperplasia, or the inflammation may terminate in suppuration. Thrombi, it is true, may occasionally be found in the hyperplastic pile.¹⁵ In this event, however, their presence is accidental and not at all to be considered as a cause of the pile, the altered condition of the tissue through which the vein passes causing retardation and stasis of the blood current, producing what Bilroth calls "thrombus from compression."¹⁶ The cutaneous pile, resulting after incision or suppuration of the thrombotic pile alluded to above, belongs to this class.

3. The *hypertrophic pile* is the condition in which the muco-cutaneous integument is left after recurrent and long-continued attacks of eczematous inflammation from whatever cause, such attacks occurring not infrequently in this locality. The congested, thickened, and infiltrated integument, with exaggeration of the natural folds and furrows aggravated by rubbing and scratching, is left after subsidence of the inflammation more or less hypertrophied. The resulting hypertrophy is most marked in the natural radiating folds, a characteristic point being that the enlargement is present in the entire length of the fold. From the exudation which accompanies this inflammation the hypertrophied folds are kept continually moist, giving them a whitish and macerated appearance, completely obscuring the pigmentation normally present in the part.¹⁷ From the association of this cutaneous pile with an eczematous inflammation it is often assumed that the presence of the pile is the cause of or a source of aggravation to the eczema,¹⁸ and the removal of the hypertrophied folds is recommended as a salutary measure. This view,

it seems to me, is fallacious, inasmuch as the cutaneous pile stands in no way as an etiological factor of the eczema, but the eczema is the cause of the pile,¹⁹ and the indiscriminate removal of the *hypertrophic pile* would produce a condition far worse than the disease for which it was supposed to be responsible.

The main object of this contribution is to emphasize the important fact in the etiology and pathology of external piles that certain pre-existing abnormal conditions are indicated whenever such piles are found. It follows as a natural sequence that successful treatment of this affection demands a knowledge of the etiology. The clinical features and treatment will be considered at length in following communications. It may be noticed here, however, that the necessity of so radical a measure as excision will be limited to the *hyperplastic pile*, the mechanical inconvenience of which may demand this operation. For the relief of the *thrombotic pile* incision alone will in most cases suffice.

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